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Exercise in the Treatment of Major Depressive Disorder

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Abstract

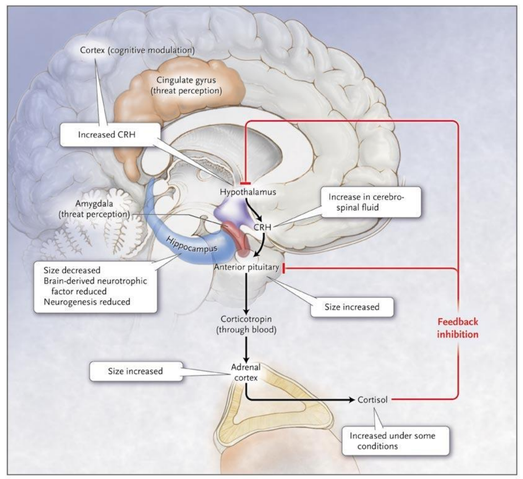
Objective
The purpose of this systematic literature review is to determine how exercise can be incorporated into the treatment of major depressive disorder (MDD) and its efficacy.
Methods
In this review, four databases were searched including SportDiscus, Pubmed, Cochrane Database of Systematic Reviews, and PsycInfo from October 1 to January 5, 2018. A variety of key terms were used when searching. Works chosen for review were published after the year 2000, were peer reviewed, and included randomized control trials (RCTs), pilot studies, systematic reviews, and meta-analyses. Sources that were excluded included those published prior to the year 2000, had poor study design, and included comorbid psychiatric conditions varying from MDD.
Results
For this review, 17 resources were selected. Much of the research presented shows evidence for the use of exercise in the treatment of MDD. However, most of the research points to exercise as more of a beneficial augmentation strategy for MDD versus a first line therapy involving pharmacotherapy with selective serotonin reuptake inhibitors (SSRIs) and psychotherapy in disease treatment.
Conclusion
Current research on the topic of exercise as therapy for MDD does show promise; however, more research still needs to be done in order to place exercise as an equivalent treatment to pharmacotherapy or psychotherapy.

Introduction

- Prevalence of MDD in the U.S. is 7%, lifetime prevalence is 16.6%
- MDD is a purely clinical diagnosis based on patient history and symptoms
- Hypotheses regarding the pathogenesis of depression:
  - An imbalance in the hormones serotonin, tryptophan, noradrenaline, and dopamine
  - Areas of the brain that show functional and structural abnormalities include anterior cingulate, orbitofrontal cortex, amygdala and basal ganglia, hippocampus, prefrontal cortex, ventral striatum, hypothalamic pituitary adrenal axis, and the nucleus accumbens

Statement of the Problem

- 1st line treatment for MDD involves psychotherapy or pharmacotherapy with SSRIs
  - Psychotherapy is difficult to access in rural areas with a shortage of trained counselors and psychiatrists
  - 40% of patients treated with SSRIs do no respond to therapy
  - Many patients treated with SSRIs complain of undesirable side effects
- Exercise is a potential benign, accessible, and affordable treatment option in mild to moderate MDD

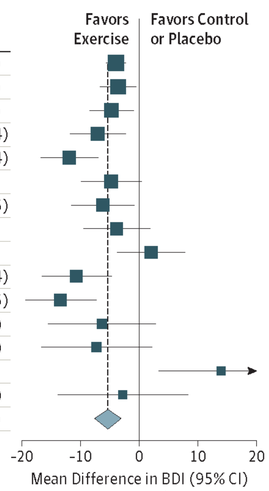


The Hypothalamic–Pituitary–Cortisol System in Depression. Belmaker, R.H. & Agam, G. (2008). Major Depressive Disorder. *New England Journal of Medicine, 358(55-68). doi: 10.1056/NEJMra073096*

Research Question & Analysis

- What role exercise may have in the treatment of MDD?
  - Type, duration, and frequency of exercise most efficacious for MDD treatment will be assessed
  - Exercise will be compared to pharmacotherapy, psychotherapy, and exercise as augmentation to pharmacotherapy and/or psychotherapy
  - It is expected that exercise therapy will have benefits over SSRIs and psychotherapy but will not necessarily be superior to the latter two
- A systematic literature review will look at efficacy of the three therapies in regard to access, adherence, remission, and improvement of symptoms

Study	Mean Difference in BDI (95% CI)
Singh, 1997	-4.00 (-5.53 to -2.47)
McNeil, 1991	-3.60 (-6.55 to -0.65)
Chu, 2008	-4.78 (-8.41 to -1.15)
Doyne, 1987	-7.07 (-11.70 to -2.44)
Mutrie, 1988	-11.94 (-16.74 to -7.14)
Hoffman, 2010	-4.80 (-9.80 to 0.20)
Hemat-Far, 2012	-6.20 (-11.45 to -0.95)
Veale, 1992	-3.85 (-9.43 to 1.73)
Fremont, 1987	2.00 (-3.71 to 7.71)
Martinsen, 1985	-10.70 (-16.56 to -4.84)
Reuter, 1984	-13.46 (-19.37 to -7.55)
Hess-Homeier, 1981	-6.40 (-15.47 to 2.67)
Epstein, 1986	-7.30 (-16.62 to 2.02)
Bonnet, 2005	13.96 (3.34 to 24.58)
Foley, 2008	-2.82 (-13.84 to 8.20)
Overall	-5.34 (-7.50 to -3.19)



Cooney, G. M., Dwan, K., Greig, C. A., Lawlor, D. A., Rimer, J., Waug, F. R., . . . Mead, G. E. (2013). Exercise for depression. *Cochrane Database of Systematic Reviews.* doi:10.1002/14651858.CD004366.pub6

Literature Review

- Decreased hippocampal volume and function in MRI with increasing depressive episodes
- **Theme one: Type of Exercise, Intensity, and Dose for Therapeutic Benefit**
  - Neither aerobic or resistance training are superior to each other
  - Optimal therapeutic effect of exercise was 3 or more times per week for at least 30 minutes
  - Cochrane review of 39 studies showed that mixed aerobic and anaerobic exercise was most beneficial in MDD treatment and it took 13 to 36 sessions in order to see a large effect
  - Effect of exercise drops off after greater than 3 hours per week
  - Discontinuation of exercise causes worsening of depressive symptoms – not curative
- **Theme two: Exercise Compared to SSRIs and Psychotherapy**
  - Cochrane Review of 39 studies showed no significant difference comparing exercise to pharmacological and psychological treatment
  - Physical exercise was compared to usual care and placebo
  - Exercise compared to placebo showed a statistically significant improvement of depressive symptoms in mild to moderate MDD
- **Theme three: Exercise as Adjunctive Therapy for Depression**
  - Partial responders to SSRIs were assigned either a high or low dose exercise regimen; results showed significant improvement of depressive symptoms and quality of life in both groups
  - All participants were given 50 mg of sertraline and allowed to increase medication dose as needed; half of the participants were started on an exercise regimen as well; participants who were in the exercise group needed lower doses of sertraline but both groups had similar reduction in depressive symptoms
  - A study by Murri et al., randomized participants to sertraline plus non-progressive exercise, sertraline plus progressive exercise, and sertraline alone; showing a much higher remission rate for those in either exercise group compared to sertraline alone

Discussion

- One pitfall to many of the studies is that they excluded patients with MDD who were already living active life style and exercising; also, participants had to be willing to participate in an exercise regimen
- The study where participants got to choose their own intensity of exercise showed benefit, which is useful to know
- One study did show that the most effective dose for treatment in MDD is 30 minutes 3 times per week, which is not a very high number and may make exercise a more attractive treatment option for patients
- More adverse effects were seen in patients treated with pharmacotherapy versus exercise therapy
- Antidepressants such as sertraline are given a warning that they take weeks to months to take effect; therefore, starting patients on an exercise regimen at the same time as medication administration may result in a quicker improvement of depression symptoms

Applicability to Clinical Practice

- Exercise may play the best role as augmentation to psychotherapy or SSRIs pharmacotherapy as it relieves symptoms more rapidly than either of the two alone
- Starting patients on a mixed aerobic and resistance training program, 3 or more times per week is shown to be the most beneficial
- Patient empowerment is a major component to treating a patient; using exercise as a treatment gives the patients responsibility and control over their medical condition
- Concerns for using exercise as a therapy includes compliance, access, and ease of therapy; no doubt that taking a single pill daily is less time consuming than exercise
- Exercise has many other medical benefits including weight reduction, musculoskeletal strengthening, and cardiac conditioning
- More research needs to be done on the topic of exercise in the treatment of MDD

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